

DoD M&S Executive Agents (Environment) Air Force, Navy, & NGA



DoD's Ability to Exploit the Environment in M&S

2008 Defense Modeling and Simulation Conference



Mr. Keith Seaman
For

Dr. Fred Lewis
Air Force Director of Weather,
DoD ASNE MSEA Senior Lead

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Overview

■ Background

- Replicating Natural Environments
- M&S Environment Domain Leads for all DoD
- Current Requirements

■ Joint End-to-End Program

■ Way Ahead



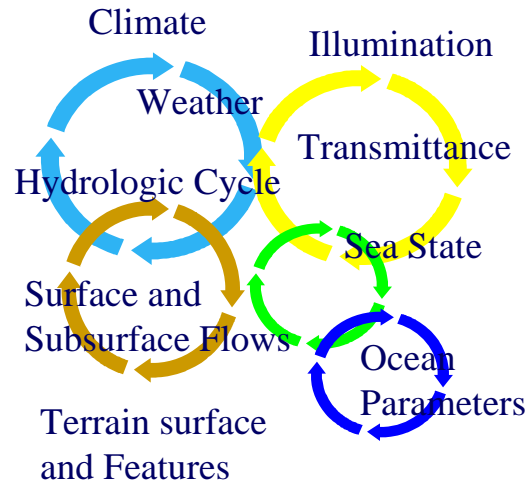
WHY REPLICATE THE ENVIRONMENT

Goal: Effect System Performance/Human Behaviors within M&S

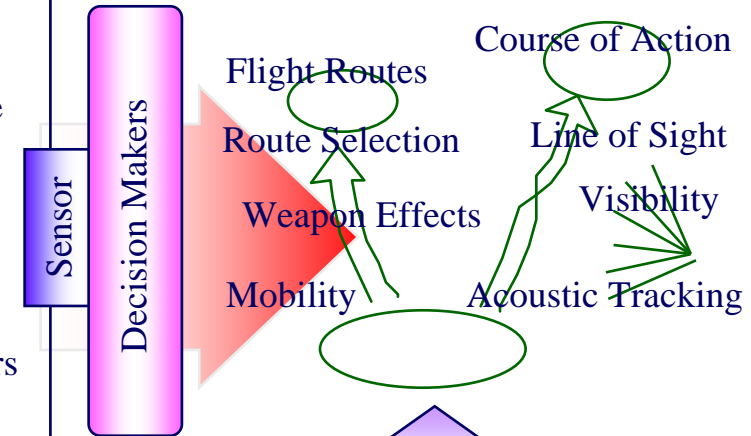
Natural



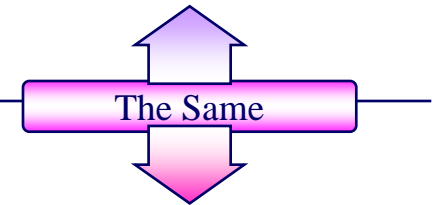
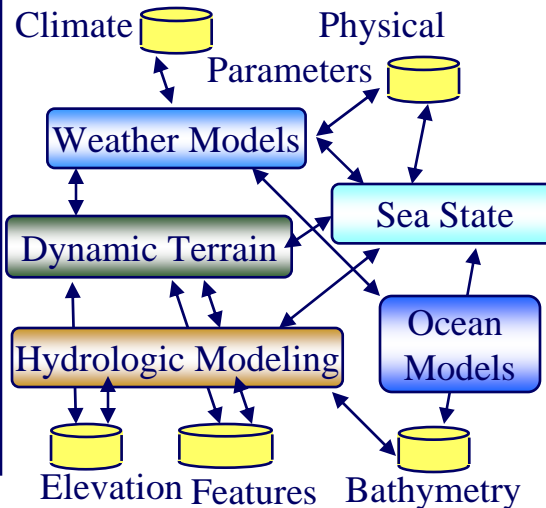
Processes



System Performance



Synthetic



WHO We Are

“DoD’s Modeling and Simulation Executive Agents (MSEA)”

■ DoD MSEAs for Natural Environment

- Air & Space Natural Environment: Dept of Air Force
- Ocean: Dept of Navy
- Terrain: National Geospatial-Intelligence Agency (NGA)



MISSION: “Enable M&S developers and users to represent the natural environment and its effects rapidly, thoroughly, and consistently in a manner that promotes cost-effectiveness, ready access, interoperability, re-use, and confidence.”

WHAT IS Needed

“Services/Components/Communities M&S Environment Requirements”

Data

- Industry/Government Standards
- Access On-The-Shelf Repositories
- Tailored Scenarios
- Integrated Domains
- Consistent Domains

Services

- Compatible with Service Oriented Architectures
- Just-In-Time Tailored Production

Tools

- Visualizations
- System Performance Effects
- Seamless Integration
 - ♦ M&S Architectures
 - ♦ C4I systems
 - ♦ National Data Repositories
- Automation

Other

- Reuse Existing Resources
- Leverage National Environment Centers of Expertise
- Correlate & Integrate Environment in Live and Virtual Systems with Constructive Simulations (JLVC, JMETC, DMO, etc)

JOINT END-TO-END PROGRAM

“A Factory to Foxhole Process”

#1

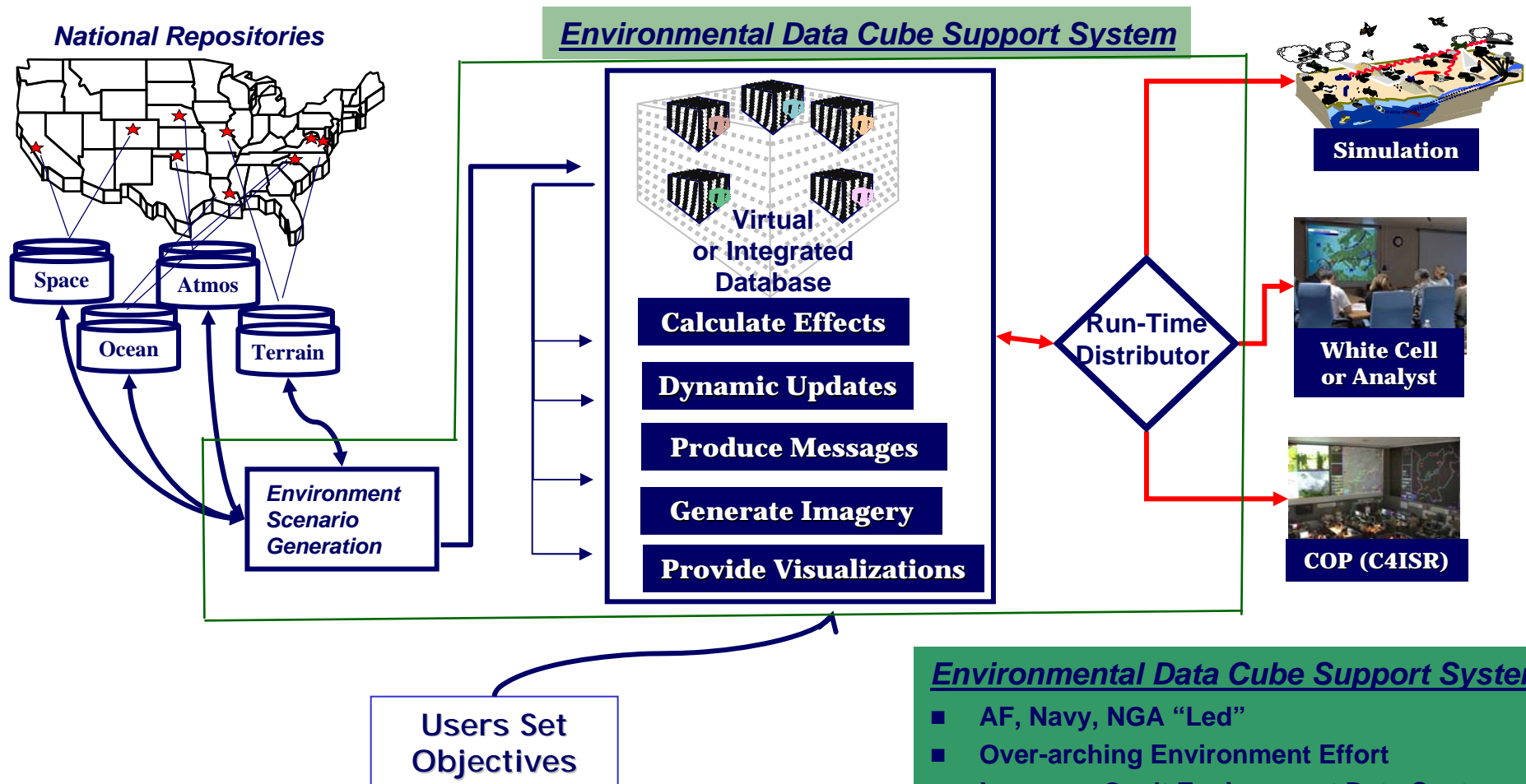
**Build & Tailor
Data**

#2

**Correlate
Products, Effects**

#3

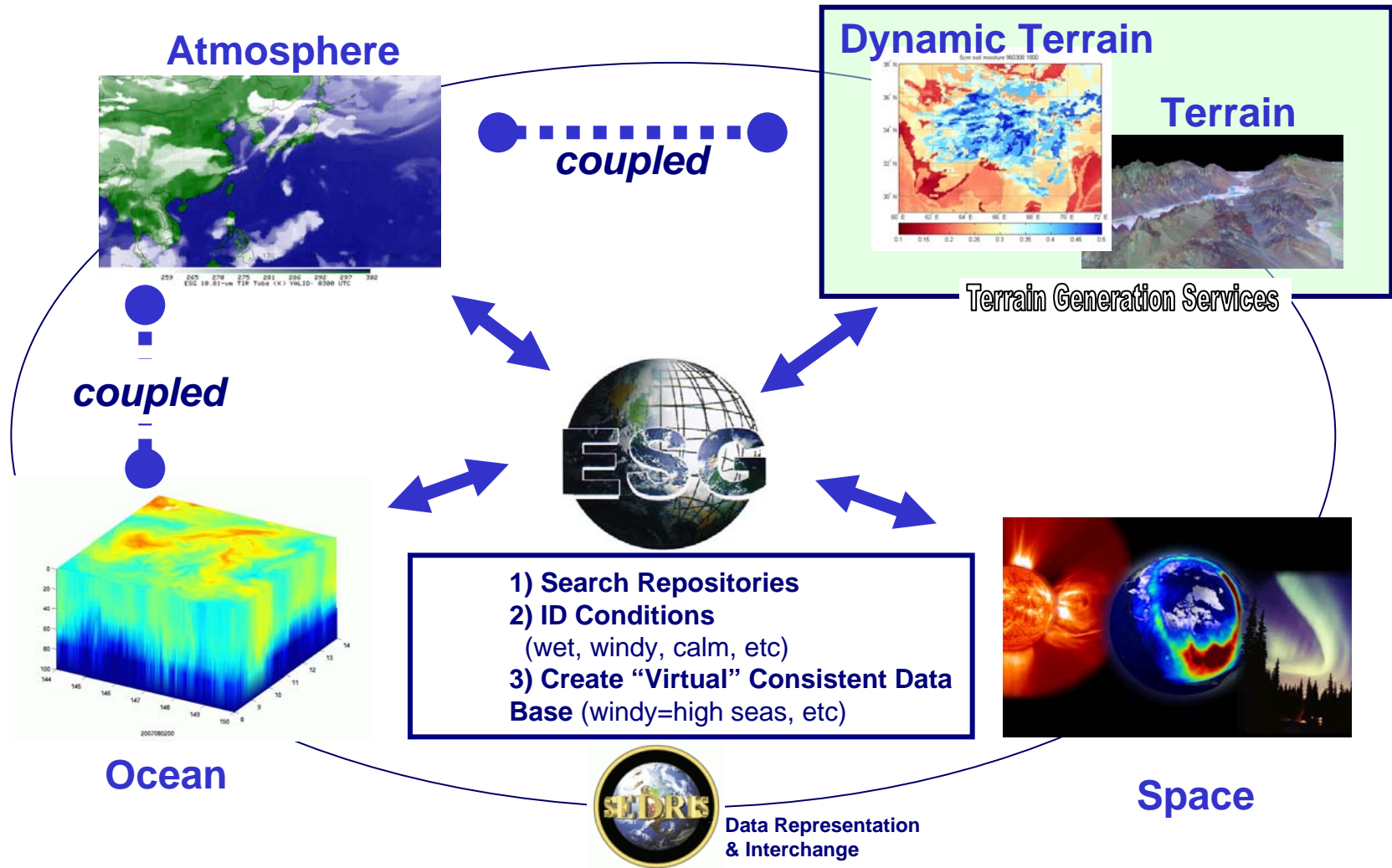
**Distribute
Live, Virtual, Constructive**



Environmental Data Cube Support System

- AF, Navy, NSA "Led"
- Over-arching Environment Effort
- Leverage Gov't Environment Data Centers

#1: Build & Tailor Databases, On-Demand



Next Steps

1. Web Services for Ocean, Space
2. Fully automate JTDS/TGS (terrain) connectivity
3. Enhance standard interchanges

#2: Correlate Products & Effects

"Mobility Hypercube"



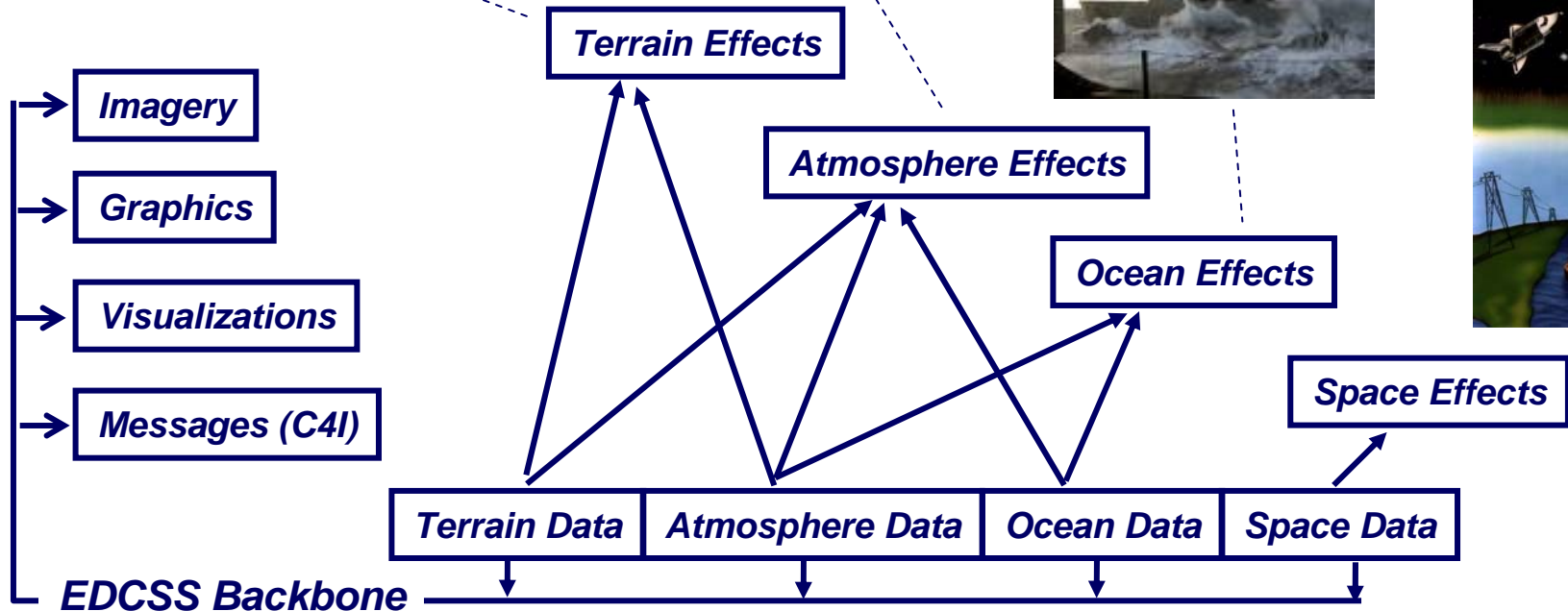
"Target Hypercube"



"IAMPS"



"SEIS"

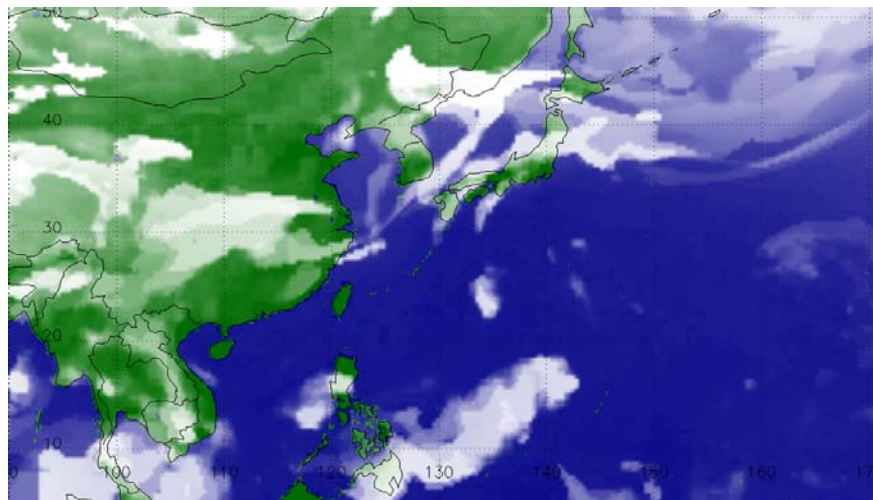


Next Steps

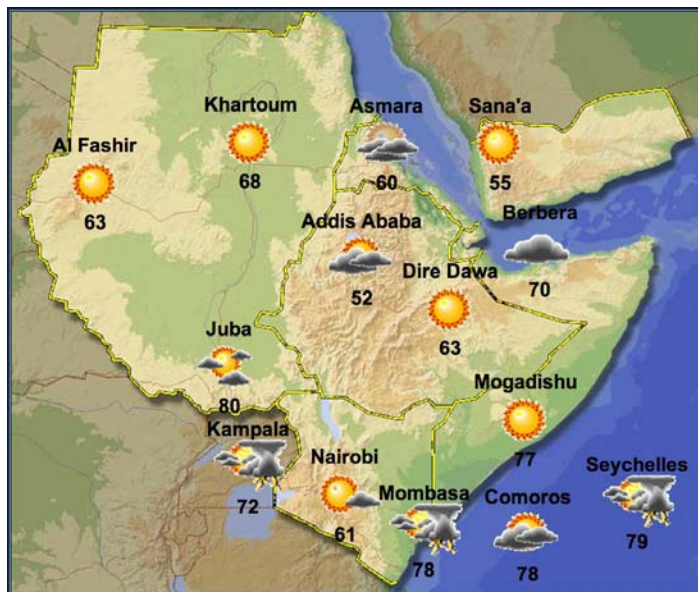
1. Automate IAMPS/SEIS reachback into Navy and NGDC
2. Improve Imagery resolution for IO and IC
3. Integrate and enhance National Labs work on mobility



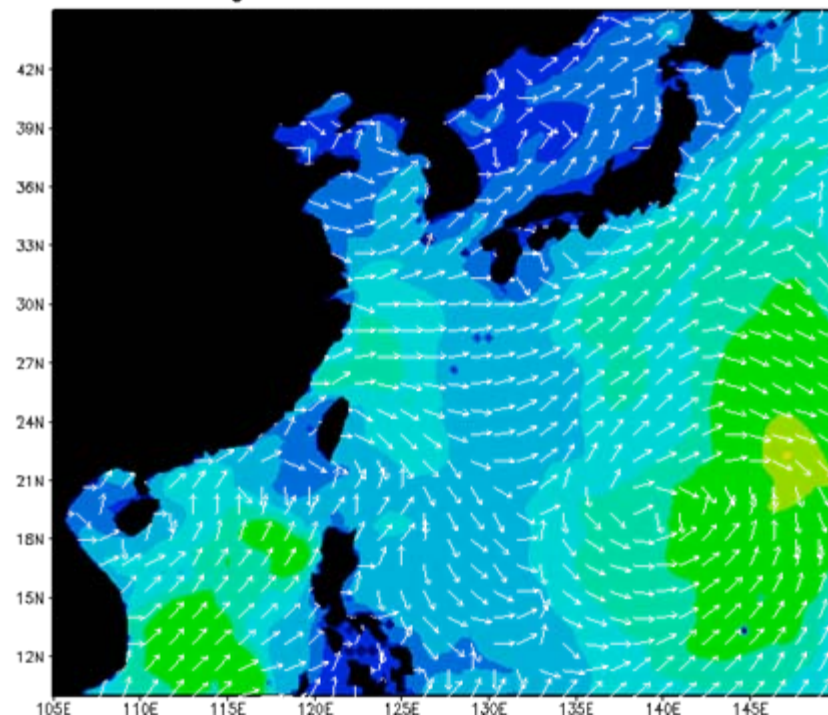
Sample Synthetic Imagery, Messages (via EDCSS): PACOM, JTF Horn of Africa



259 265 270 275 281 286 292 297 302
ESG 10.81-um TIR Tobs (K) VALID: 0300 UTC



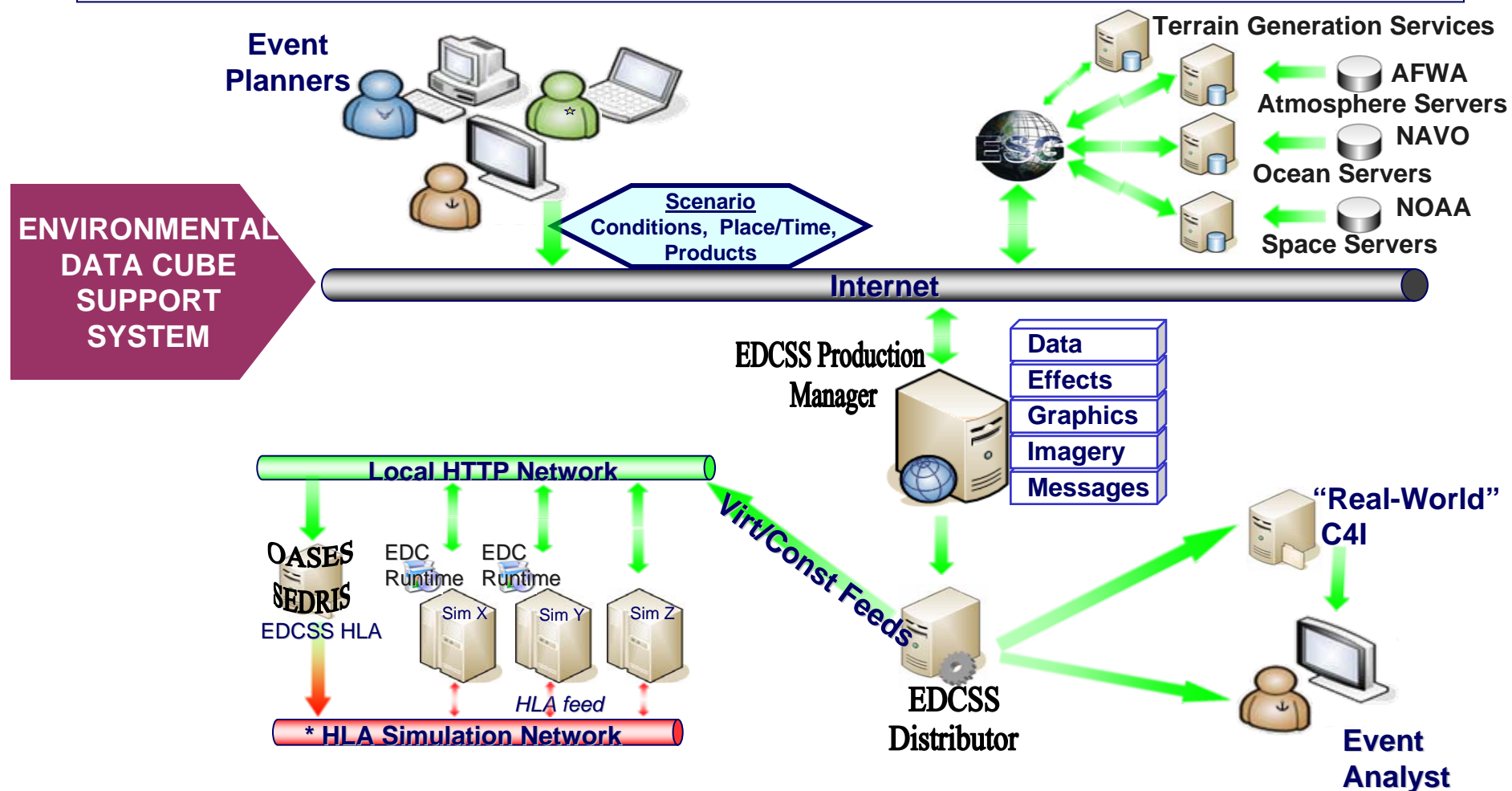
WvHgt and WvDir 19980912 00Z



SAUS11 KAWN 061200 RRX

METAR ZBAA 290200Z 12007KT 10SM CLR 26/19 Q0988 RMK
SLP149 LAT399N LON1163E ESGACMES=

#3: Distribute Environment Data & Products



Next Steps

1. Automate the dynamic weather/ocean overlays for JLVC
2. Build on on C4I conduits
3. Better integrate technology components (Service, joint)
4. Transition validated joint production & distribution technologies

* NOTE: HLA is Initial Prototype

M&S Environment “Hall of Fame”

Flagship Programs Leveraging EDCSS

LEAD	FLAGSHIP COMMUNITY PROGRAMS	Integration Level		
		<u>Started</u>	<u>Partial</u>	<u>Fully</u>
Army	Future Combat Systems (FCS)	X		
Army	One Semi-Autuated Forces (ONESAF)	X		
Army	Army SOF Aviation Training and Rehearsal System (ASTARS)	X		
Navy	Joint Semi-Automated Forces (JSAF)		X	
Navy	Integrated Warfare Systems (IWS) Testbed		X	
Air Force	Air Force Modeling and Simulation Training Toolkit (AFMSTT)		X	
Air Force	Talon SHU	X		
Air Force	Storm		X	
Air Force	Thunder		X	
Air Force	Distributed Mission Operations (DMO)	X		
Joint	Joint Expeditionary Force Experiment (JEFX)			X
Joint	Joint Strike Fighter	X		
Joint	Joint Rapid Scenario Generation (JRSG)	X		
Joint	Joint Training Data Services (JTDS)	X		
Joint National Training Capability	Joint Live-Virtual Constructive (JLVC) Federation		X	
PACOM	Terminal Fury			X
EUCOM	Austere Challenge		X	
JFCOM	Joint Conflict and Tactical Simulation (JCATS)		X	
JFCOM	Joint Analysis System			X
Multi-National Experiment	Urban Resolve 2015		X	
JTF Mission Rehearsal	Unified Endeavor/Horn of Africa MRX		X	
Analysis	Unified Engagement		X	
FAA/NASA	Next Generation [aircraft] Messaging System (NexGEN)	X		
Defense Threat Reduction Agency	Hazard Prediction and Assessment Capability (HPAC)			X
National Reconnaissance Office	National Warfare System (NWARS)	X		

DoD Senior Leader Perspectives on EDCSS



DEPARTMENT OF THE AIR FORCE
AIR FORCE RESEARCH LABORATORY
WRIGHT-PATTERSON AIR FORCE BASE OHIO 45433

AIRLACC
Bldg 15, Rm 225
1844 Fourth Street
Wright-Patterson AFB OH 45433-7112

Belagard General Lawrence Stutts
AF/AJO-W
1400 Air Force Pentagon
Washington DC 20330-1490

Dear General Stutts:

Please accept my thanks for the outstanding work accomplished by your Air and Space Natural Environment Modeling and Simulation Executive Agent Office in collaboration with the Lab in support of our warfighters.

Over the last six months, your team has worked closely with our Behavioral Enabling Simulation Technologies Team to develop a real-world, three-dimensional, time-phased weather dataset for potential application in Combat Air Force Distributed Mission Operations flight simulation programs.

In the past, Air Force flight simulation programs have used very simplistic weather models. As flight simulation program simulations and hence performance models.

Your organization Army, Navy, and Air environment to begin improve the training without your team's.

We sincerely appreciate and thank you for the continual improvement can provide. Again,



DEPARTMENT OF THE NAVY
WRIGHT-PATTERSON AIR FORCE BASE
1844 FOURTH STREET
WRIGHT-PATTERSON AIR FORCE BASE OHIO 45433

From: Program Executive Officer, Integrated Warfare Systems
To: Director of Weather, Brig Gen Lawrence A. Stutts
Via: JAF/EO, Brig Gen James Whitmore
Subj: LETTER OF APPRECIATION

1. I would like to personally thank you and your organization for the superior contributions made in support of Program Executive Office, Integrated Warfare Systems (PEO IWS). Through the collaboration of technical experts in both of our organizations we were able to develop the common integrated scenario environment representations for use in the LPP-17 Probability of Daid Annihilation (Pu) M&S Test bed Program.

2. The importance of using integrated scenario environment representations is well recognized, but until recently the resources required to develop and implement such representations have been prohibitive. Thanks to the Environmental Scenario Generator (ESG) technology combined with the superb support provided by the Air & Space Natural Environment Modeling & Simulation Executive Agent (ASNE MSEA) Office, the LPP 17 Pu Test bed Program was able to obtain the consistent atmosphere and ocean datasets to meet our needs.

Requirements and noted cost current ASNE MSEA billion. Through will be used for 1000, 10000, 100000.

as the ed credible, assessing hip with ASNE t in support of well done.

Defense Threat Reduction Agency
8725 John A. Kingman Road MSC 6201
Ft Belvoir VA 22060-6201

APR 23 2007

MEMORANDUM FOR USAF DIRECTOR OF WEATHER

SUBJECT: Department of Defense (DoD) Air and Space Natural Environment Modeling and Simulation Executive Agent (ASNE MSEA) Support to the Defense Threat Reduction Agency (DTRA)

DTRA relies heavily on environmental products and services from the ASNE MSEA, to develop, distribute, and manage many consequence assessment and management decision-making tools. These DTRA tools are integrated into DoD's joint Chemical, Biological, Radiological, Nuclear programs (CBRN), including the Joint CBRN Warning and Reporting Network, the Joint Effects Model, and the Joint Operational Effects Federation programs. Our tools, and these critical joint programs, require the highest-quality environmental intelligence, which was provided by your ASNE MSEA team.

In the past year alone, DTRA relied upon the ASNE MSEA office in Asheville, NC, to provide tailored weather data for such events as Exercise ULCHI FOCUS LENS, validation of Hazard Prediction Assessment Capabilities plans for NATO, retrospective analysis of 1948 nuclear testing for validation of new codes, port facility analysis and survivability study for US PACOM, evaluation of intelligence hypothesis for USCENTCOM, and numerous command and base level exercises. Each request was satisfied in a timely and professional manner. Without assistance from ASNE MSEA, DTRA is limited to using archived weather files that generally do not meet our standard for accurate historical environmental data, resulting in incomplete or erroneous solutions.

Because of a possibility that the ASNE MSEA team might be reduced in the future, there is a risk that the environmental support you provide to DTRA will be degraded. When deciding on the appropriate resource level for this activity, please consider DTRA's reliance on ASNE MSEA support in executing its mission as a Combat Support Agency.

Thank you again for your continued support to DTRA and consideration of this matter.

R. R. Castro
RANDAL R. CASTRO
Major General, USA
Deputy Director

Maj Gen Ted F. Bowlds, Mar 2007

Air Force Research Lab Commander

“More Credible Performance”

“Improves Training Value to Our Warfighters”

RDML M. S. Frick, Aug 2007

Navy PEO for Integrated Warfare Systems

“Cost Avoidance of \$50M”

MGen Randall R. Castro, Apr 2007

Defense Threat Reduction Agency Deputy Director

“Validation Plumes for NATO”

“Validation for Port Facility Analysis”



Joint Collaboration The Way Forward

■ Getting Environment into M&S is no longer...

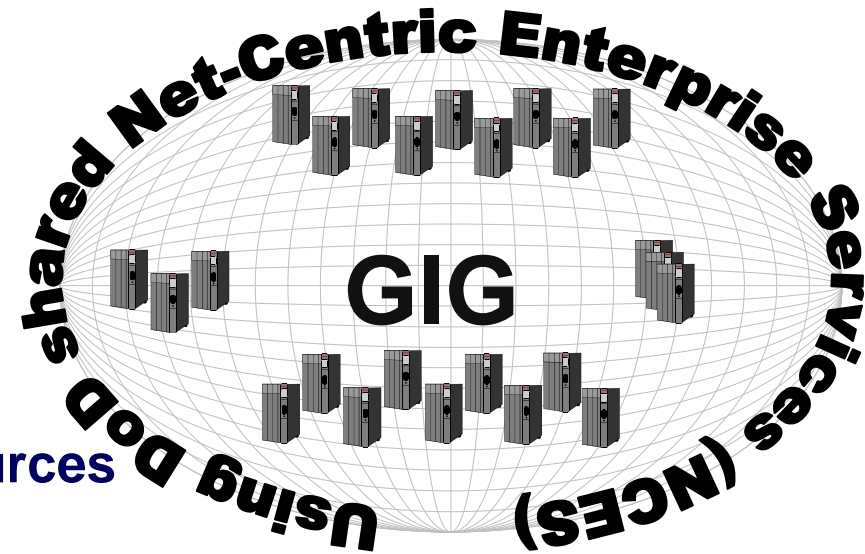
- Too hard
- Too expensive
- Too time-consuming

■ Available to all DoD

- Core Enterprise capabilities
- Access, reuse of existing resources

■ Need your programs to...

- Utilize EDCSS capabilities
- Pass new requirements to MSEAs





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